Chinese Medicine Pattern Diagnosis Could Lead to Innovation in Medical Sciences

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ABSTRACT Chinese medicine (CM) pattern diagnosis (Bian zheng or syndrome differentiation), as another patient classification approach, has been incorporated with biomedical diagnosis in clinical practice in China, and the clinical experience has proven that the integration of biomedicine and CM is better in the treatment of many diseases. CM pattern diagnosis is completely different from the diagnosis in biomedicine, and it must take an active role in innovation for medical sciences. This paper is trying to discuss how CM pattern diagnosis lead to innovations in basic research, clinical research and new drug discovery. Scientific basis of CM pattern in innovation of basic research, clinical efficacy and safety, CM pattern based clinical trial design, CM pattern and clinical practice guideline in innovation of clinical study, CM pattern based indication finding, and CM pattern based network pharmacology in innovation of new drug discovery have been discussed.

KEYWORDS Chinese medicine, pattern diagnosis, innovation in medical sciences

Chinese medicine (CM) is a system with its own rich tradition and over 3000 years of continuous practice and refinement through observation. Pattern diagnosis (Bian zheng or syndrome differentiation) is the hallmark in CM, and CM intervention is based primarily on the pattern classification.

CM pattern is the basic unit in its diagnosis, and it is determined by analysis on all symptoms and signs, including tongue appearances and pulse feelings with CM concepts. Nowadays, CM pattern diagnosis and biomedical diagnosis is integrated, and integrative medicine becomes common model in clinical practice. In the view of integrative medicine, CM pattern could be regarded as the summary of the body's condition at a certain stage in a disease process. However, CM pattern is more complicated in defining ill state since CM pattern could change following the CM pattern information (symptoms, signs, tongue appearance, and pulse feelings) and more combined pattern would show up in many cases.

CM pattern classification, as another patient classification approaches, has been incorporated with biomedicine diagnosis in clinical practice in China, and the clinical experience for long time could prove that the integration of biomedicine and CM is better in the treatment of many diseases. Also the research on CM pattern has become a hot topic in CM and integrative field. Since CM pattern diagnosis is completely different from the diagnosis in biomedicine and CM pattern classification has been proven to be an effective way for patient classification, CM pattern diagnosis would lead more scientific new findings for medical sciences. In this paper, how CM pattern diagnosis lead to innovations in medical sciences, including in basic research, clinical research and new drug research and development, is discussed.

CM Pattern Diagnosis and Innovation in Basic Research

CM pattern diagnosis, as a classification approach, could be used together with disease diagnosis. At that point, CM pattern diagnosis could lead to some new findings for diagnostics in medical sciences. Some studies of Chinese medicinal herbs
used in a specified CM pattern have confirmed a biological basis for CM effect, and the results included the linkage between sex hormones and Kidney deficiency pattern in chronic nephritis, linkage between C-reactive protein (CRP) and cold/hot pattern in rheumatoid arthritis (RA), linkage between homoeorheology and blood stasis pattern in cardiovascular diseases, and linkage between gastric mucosal immune reactions and the CM pattern in chronic gastritis. The correlation analysis between CM pattern information and biomedical parameter is one part of basic research in integrative medicine, which might lead to new findings in medical sciences.

On the other hand, full understanding of the inherent mechanism of the CM pattern in a disease could help further exploration in pathogenesis study for the disease. Yet, it is very difficult to implement the exploration using existing conventional methods. The advances of "Omics" revolution and methodology in modern life science, bioinformatics and systems biology have offered an opportunity to integrate multidimensional and various types of data, and capturing these unprecedented opportunities and challenges, bioinformatics and systems biology approaches are expected to open the way to a new convergence of CM pattern information and biomedicine in both concept and methodology. In the exploration on the biological basis of CM patterns, the molecular basis of CM pattern within the context of neuro-endocrine-immune (NEI) system was explored. Our previous studies showed that there were some distinct molecular signatures in discriminating the RA patients with CM cold pattern and heat pattern with related syndrome. Thus more important innovation in basic research might be from the correlation analysis among CM patterns with bioinformatics.

CM pattern diagnosis in a disease also could help find some new ideas for the pathogenesis of the disease. The treatment of RA with CM intervention in the later stage of the disease usually focuses on the blood stasis and deficiency CM pattern. While CM blood stasis pattern shows some linkage with platelet activity, the CM deficiency pattern shows some linkage with immune response. Thus it is reasonable to make the hypothesis that there is a positive correlation among IgA (reflecting immune response), platelet and cartilage erosion (severe in late stage) in RA. The changes in peripheral IgA level and platelet number positively correlated with the grade of cartilage damage in active RA patients, thus supporting the hypothesis. In the clinical practice, the Chinese herbal medicine with activating blood stasis pattern, and those reinforcing deficiency pattern and containing polysaccharides or animal proteins were used for the treatment. In summary, biomedical sciences not only help identify the scientific basis for CM pattern, but also can improve further clarification of CM pattern.

Another important concept in CM named as "Treating Different Diseases with the Same Therapy" has been applied in CM practice. This means that two patients with different disease diagnoses will receive similar Chinese medical treatments if their Chinese patterns are similar. For instance, some patients with RA and other with coronary heart disease can be treated with similar therapies (For example, activation of blood stasis for RA patients with CM pattern of blood stasis). This suggests that there could be something commonly existing between RA and CHD conditions according to CM diagnosis within the context of imbalance in the body functions biological networks or biological basis. Because of the complexity of human being, possible novel and groundbreaking connections between diseases are often missed by researchers even though they can be readily inferred from the existing literatures.

In recent years, data mining methods have been used on large literature databases to extract new and meaningful information, and many researches have shown that data mining can both model complex biological pathways and serve the purpose of hypothesis generation and biological discovery. Data mining approaches are also used for CM to identify required information more efficiently, discover new relationships which are obscured by merely focusing on biomedicine, and bridge the gaps between biomedicine and CM. In order to substantiate such concepts, there exists a need to search for these interlinking data from reliable databases. Presently in our leading research database the amount of biomedical data is growing rapidly, it is possible to get relevant and meaningful information through the techniques developed in the fields of data mining. Our previous study proposed an hierarchical analysis algorithm called discrete derivatives which is based on the frequencies of co-concurrent "The Medical Subject Headings" (MeSH) terms, we have found some